

## Claims

We claim:

1. An inlet plate for a fan housing, the inlet plate comprising:

a one-piece unitary body having

a first portion defining an intake aperture positioned relative to a central axis and affording fluid flow into the housing; and

a second portion integral and continuous with the first portion and extending at an angle with respect to the first portion in a direction toward an interior of the fan housing, the second portion defining an intake baffle of the fan housing.

2. The inlet plate of claim 1, further comprising a plurality of mounting apertures located along an outer periphery of the first portion, the mounting apertures adapted to receive fasteners for securing the inlet plate to the housing.

3. The inlet plate of claim 1, wherein the first portion and the second portion share a common boundary defined by a transition line between the first and second portions.

4. The inlet plate of claim 1, wherein:  
the second portion has a peripheral edge having a shape;  
the aperture has a peripheral edge having a shape; and  
at least part of the peripheral edge of the second portion matches the shape of at least part of the peripheral edge of the first portion.

5. The inlet plate of claim 3, wherein:  
the intake aperture is at least partially defined by an arcuate edge; and  
the transition line extends substantially chordally with respect to the arcuate edge, thereby providing the intake aperture with a substantially D-shaped profile.

6. The inlet plate of claim 1, wherein the intake aperture is at least partially defined by a first arcuate edge, at least part of the first arcuate edge having a substantially constant radius with respect to the central axis of the fan housing.

5 7. The inlet plate of claim 6, wherein the second planar wall includes a second arcuate edge having a radius that is at least about 80% of the substantially constant radius of the first arcuate edge.

10 8. The inlet plate of claim 7, wherein the second arcuate edge radius is at least about 95% of the substantially constant radius of the first arcuate edge.

15 9. The inlet plate of claim 1, wherein when the inlet plate is secured to the housing, and wherein the inlet plate substantially entirely defines one side wall of the housing.

10. A one-piece inlet plate for a fan, the one-piece inlet plate comprising:  
a plate having:

a first, generally planar wall defining an intake aperture positioned  
relative to a central axis;

5 a second, generally planar wall extending inwardly with respect to the  
aperture at an angle with respect to the first wall, the second  
wall meeting the first wall along a transition line.

10 11. The one-piece inlet plate of claim 10, wherein the intake aperture is  
substantially D-shaped.

12. The one-piece inlet plate of claim 10, wherein the intake aperture includes  
a first arcuate edge, at least a portion of the first arcuate edge having a substantially  
constant radius.

15 13. The one-piece inlet plate of claim 12, wherein the transition line extends  
substantially chordally with respect to the first arcuate edge.

14. The one-piece inlet plate of claim 12, wherein the second planar wall  
20 includes a second arcuate edge having a radius that is at least about 80% of the  
substantially constant radius of the first arcuate edge.

15. The one-piece inlet plate of claim 12, wherein the second planar wall  
includes a second arcuate edge having a radius that is at least about 95% of the  
25 substantially constant radius of the first arcuate edge.

16. The one-piece inlet plate of claim 10, wherein the transition line is  
substantially straight.

30 17. The one-piece inlet plate of claim 10, wherein the inlet plate substantially  
entirely defines a sidewall of the fan when the inlet plate is secured to the fan.

18. A method for making an inlet plate for a fan having a housing, the method comprising:

providing a plate;

forming an aperture in the plate;

5 bending the plate along a line to define a first wall surrounding the aperture and a second wall at an angle with respect to the first wall and extending inwardly with respect to the aperture and the housing.

19. The method of claim 18, wherein forming an aperture in the plate includes  
10 defining at least part of a periphery of the second wall oriented substantially parallel to the first wall.

20. The method of claim 18, wherein forming an aperture in the plate includes  
15 separating an arcuately-shaped peripheral portion of the second wall from a matching peripheral portion of the first wall.

21. An inlet structure for a fan housing adapted to enclose a fan, the fan housing having an inlet side through which fluid is received into the fan housing, the inlet structure comprising:

20 a first wall located adjacent the fan and at least partially covering a side of the fan, the first wall separated from the side of the fan by a clearance distance and at least partially surrounding an inlet aperture leading to an internal chamber in the fan housing; and

25 a second wall integral with the first wall, the second wall extending from the inlet aperture to a location inside the fan within the fan housing.

22. The inlet structure of claim 21, wherein the first wall is contiguous the second wall.

30 23. The inlet structure of claim 21, wherein the first wall is separated from the second wall by a third wall recessed with respect to the first wall.

24. The inlet structure of claim 23, wherein the third wall surrounds and defines the inlet aperture.

5           25. The inlet structure of claim 22, wherein the first wall surrounds and defines the inlet aperture.

26. The inlet structure of claim 21, further comprising at least one additional wall extending from the first wall to at least partially surround an outermost radial  
10 periphery of the fan.

27. The inlet structure of claim 21, wherein the fan housing is a two-piece fan housing, the first wall, second wall, and at least one additional wall defining one piece of the two-piece fan housing.

15           28. The inlet structure of claim 21, further comprising at least one mounting boss integrally formed on the first wall.

29. The inlet structure of claim 21, wherein the second wall is a curved  
20 partially spherical wall recessed within the internal chamber of the housing.

30. The inlet structure of claim 29, further comprising a substantially planar baffle wall integral with the second wall and extending from the second wall to a location inside the fan.

25           31. The inlet structure of claim 21, wherein the fan is rotatable about an axis, the first wall having different portions located at different circumferential positions about the inlet aperture, the different portions located at different axial locations with respect to the inlet aperture.

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32. The inlet aperture of claim 31, wherein the first wall is shaped to at least partially define an internal chamber cross-sectional area that increases in size in a range of different circumferential positions around the inlet aperture.

5 33. A method of creating an inlet structure for a fan housing adapted to enclose a fan having an intake side through which fluid moves during operation of the fan, the method comprising:

forming a first wall of the fan housing, the first wall adapted to at least partially cover the intake side of the fan and to cooperate with other  
10 walls of the fan housing to enclose the fan;

forming an aperture in the first wall, the aperture defining an intake aperture through which fluid enters the fan housing; and

forming a second wall of the fan housing integral with the first wall and extending into the internal chamber of the fan housing, the second  
15 wall terminating at a location inside the fan.

34. The method of claim 33, wherein forming the first wall, aperture, and second wall includes molding the first wall, aperture, and second wall as a single integral element.

20 35. The method of claim 33, wherein the first wall, aperture, and second wall are formed substantially simultaneously.

36. The method of claim 33, wherein forming the second wall includes  
25 forming the second wall contiguous the first wall.

37. The method of claim 33, further comprising forming a third wall intermediate and integral with the first and second walls, the third wall recessed with respect to the first wall.

38. The method of claim 37, wherein the third wall surrounds and defines the intake aperture.

5 39. The method of claim 33, wherein the first wall surrounds and defines the intake aperture.

10 40. The method of claim 33, further comprising forming at least one additional wall contiguous and integral with the first wall and extending around at least part of a radial periphery of the fan.

41. The method of claim 40, wherein the first wall, the aperture, the second wall, and the at least one additional wall are formed substantially simultaneously.

15 42. The method of claim 41, wherein:  
the fan housing is a two-piece fan housing; and  
the first wall, the second wall, and the at least one additional wall define one piece of the two-piece housing.

20 43. The method of claim 33, further comprising forming at least one boss on the first wall, the at least one boss adapted to receive at least one fastener for mounting the fan housing to a surface.